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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,895	04/13/2004	Michael A. Rothman	P19009	5656

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EXAMINER	
YU, JAE UN	

ART UNIT	PAPER NUMBER
2185	

NOTIFICATION DATE	DELIVERY MODE
12/12/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

krvuspto@ipmatters.com

Office Action Summary	Application No.	Applicant(s)	
	10/823,895	ROTHMAN ET AL.	
	Examiner	Art Unit	
	JAE U. YU	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The examiner acknowledges the applicant's submission of the response dated 10/10/2008. At this point claims 1-34 are pending in the instant application.

Response to Amendment

The examiner withdraws the 35 USC 101 rejection for claims 23-31, wherein the claimed "computer readable storage medium" is defined as one of the storage mediums listed in paragraph 19 of the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-2, 7-9, 10-11, 16-18, 19, 21, 23-24 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863).

2. As per **independent claims 1, 10, 19 and 23**, Lawrence et al. disclose; "receiving an I/O request to update an object **["File", Column 5, Lines 37-39]** in the storage **["Storage Medium", Column 5, Line 42]**", "defragmenting the object in the storage **[Defragmenting the file in storage, Column 5, Lines 37-39]** so that blocks in

storage including the object are contiguous **["Stored in contiguous region of the storage medium", Column 5, Lines 41-42]** in response to receiving the I/O request to update the object, wherein the request to update the object causes the defragmentation operation **[Running a defragmentation program before the copy operation, Column 5, Lines 37-39]**", and "executing the I/O request to update the object in the storage **[Copying the files in storage, Column 5, Lines 37-39]**".

Lawrence et al. do not disclose expressly that the update operation is a write operation.

Andrew et al. disclose a shutdown operation that triggers a defragmentation in Figure 4, wherein a shutdown operation inherently comprises disk write operations.

Lawrence et al. and Andrew et al. are analogous art because they are from the same field of endeavor of storage device access control.

At the time of the invention it would have been obvious to combine Lawrence et al. with Andrew et al. by defragmenting a hard drive in response to a system shutdown request as taught by Andrew et al. in Figure 4.

The motivation for doing so would have been to optimize the system performance as expressly taught by Andrew et al. in abstract.

Therefore, it would have been obvious to combine Andrew et al. for the benefit of system performance improvement to obtain the invention as specified in claims 1, 10, 19 and 23.

3. **Claims 2, 11 and 24** disclose, "the I/O request is executed with respect to the object after defragmenting the object". **Lawrence et al. disclose copying file ("I/O request to the object" from the claim) after running a defragmentation program in column 5, Lines 37-39.**

4. **Claims 7, 16 and 29** disclose, "determining whether the object is read-only, wherein the object is defragmented if the object is not read-only, wherein the I/O request to update the object is executed without defragmenting the object in response to determining that the object is read-only". **Read-only means that the object is write-protected. Since defragmenting comprises the process of copying/deleting of an object to a different location, Lawrence et al. inherently defragment only "not write-protected" ("not read-only" from the claim) objects.**

5. **Claims 8-9, 17-18 and 30-31** disclose, "the operation of receiving the I/O requests, initiating the operation to defragment the object, and executing the I/O request of defragmenting the object in storage are performed by a storage controller managing I/O requests to the storage and a device driver for the storage providing an interface to the storage". **Lawrence et al. disclose the operation of defragmenting the object in**

storage in a computer system. Therefore, the computer system inherently includes the "storage controller" and the "device driver" from the claim.

6. **Claim 21** discloses, "the storage controller and storage device are included in the same housing **[Computer System]". Lawrence et al. disclose defragmenting in a computer system that inherently includes the "storage controller" and the "storage device" from the claim.**

7. Claims 3, 12, 20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863) as applied to claims 1, 10, 19 and 23 above and further in view of Brown, III et al. (US 6,038,636).

8. As per **claims 3, 12, 20 and 25**, Lawrence et al. and Andrew et al. disclose, "determining whether an amount of fragmentation of the object in the storage exceeds a fragmentation threshold **[Any amount of fragmentation higher than zero, Column 5, Lines 37-39]** in response to receiving the I/O request, wherein the object is defragmented **[Eliminating fragmentation on the file, Column 5, Lines 37-39]** if the amount of fragmentation exceeds the fragmentation threshold **[If fragmentation exists, Column 5, Lines 37-39]**, and wherein the I/O request to update the object is executed without defragmenting the object in response to determining that the amount of fragmentation does not exceed the fragmentation threshold".

Lawrence et al. and Andrew et al. do no disclose expressly, "indicating an acceptable number of bytes stored in non-contiguous locations".

Brown, III et al. disclose, "determining whether the size field in the file header is equal to a certain predetermined code" (Column 10, Lines 1-5), wherein the size is represented as "bytes" (Column 7, Lines 45-46).

Lawrence et al., Andrew et al. and Brown, III et al. are analogous art because they are from the same filed of endeavor of defragmenting storage devices.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Lawrence et al. and Andrew et al. by defragmenting upon determining the size of the non-contiguous data sectors as taught by Brown, III et al. in column 10, at lines 1-5.

The motivation for doing so would have been to reclaim free spaces in memory device as expressly taught by Brown, III et al. in the abstract.

Therefore, it would have been obvious to combine Brown, III et al. with Lawrence et al. and Andrew et al. for the benefit of memory optimization to obtain the invention as specified in claims 3, 12, 20 and 25.

9. Claim 22 is rejected under 35 U.S.C. 103 (a) as being obvious over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863) as applied to claims 1, 10, 19 and 23 above and further in view of Karger et al. (US 5,339,449).

10. As per **claim 22**, Lawrence et al. and Andrew et al. disclose, "a processor **[Computer System]**".

Lawrence et al. and Andrew et al. do not disclose expressly, "a memory enabled to store the I/O request before the I/O request is received by the storage controller".

Karger et al. disclose the I/O request queue in column 20, at lines 47-50.

Lawrence et al., Andrew et al. and Karger et al. are analogous art because they are from the same field of endeavor of memory management.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Lawrence et al., Andrew et al. by including an I/O request queue as taught by Karger et al. in column 20, at lines 47-50.

The motivation for doing so would have been to process the I/O requests based on their priorities in the queue as expressly taught by Karger et al. in column 20-21, at Lines 67-5.

Therefore, it would have been obvious to combine Karger et al. with Lawrence et al. and Andrew et al. for the benefit of prioritized I/O process to obtain the invention as specified in claim 22.

11. Claims 4-5, 13-14 and 26-27 are rejected under 35 U.S.C. (a) as being obvious over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863) as applied to claims 1, 10, 19 and 23 above and further in view of Douglis et al. (US 2005/0108075).

12. As per **claims 4-5, 13-14 and 26-27**, Lawrence et al. and Andrew et al. disclose, "performing defragmentation in response to receiving the I/O request".

Lawrence et al. and Andrew et al. do not disclose expressly, "determining whether a user settable flag indicates to perform defragmentation, wherein the object is defragmented if the flag indicates to perform defragmentation" and "executing the I/O request without performing defragmentation if the flag does not indicate to perform defragmentation".

Douglis et al. disclose deferring defragmentation if there is restriction of power usage ("flag" from the claim) in paragraph 32, wherein the "flag" is user settable since an user can alternate between restricted power source (battery) and unlimited power source (wall outlet).

Lawrence et al., Andrew et al. and Douglis et al. are analogous art because they are from the same filed of endeavor of defragmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Lawrence et al. and Andrew et al. by including a flag that defers defragmentation in case of battery use as taught by Douglis et al. in paragraph 32.

The motivation for doing so would have been adaptive control of application power consumption in a mobile computer as expressly taught by Douglis et al. in paragraph 2.

Therefore, it would have been obvious to combine Douglis et al. with Lawrence et al. and Andrew et al. for the benefit of efficient power consumption to obtain the invention as specified in claims 4-5, 13-14 and 26-27.

13. Claims 6, 15 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863) as applied to claims 1, 10, 19 and 23 above and further in view of Ball et al. (US 2005/0162944).

14. As per **claims 6, 15 and 28,** Lawrence et al. and Andrew et al. disclose the method and the system recited in claims 1, 10 and 23 including the limitation, "the I/O request to update object is executed" and "the object is defragmented if the object is

within one logical partition **[the object within "a disk" being defragmented, Figure 7]**".

Lawrence et al. and Andrew et al. do not disclose expressly not defragmenting the object in response to determining that the object is included in more than one logical partition.

Ball et al. disclose the object (Element 24) included in more than one logical partition (partitions a-d), wherein the active memory is not defragmented (Abstract).

Lawrence et al., Andrew et al. and Ball et al. are analogous art because they are from the same filed of endeavor of defragmenting storage devices.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Lawrence et al. and Andrew et al. by not defragmenting the active memory and defragmenting the redundant inactive memory instead as taught by Ball et al. in the abstract.

The motivation for doing so would have been to minimize the impact of defragmentation, thus, increasing the system performance as expressly taught by Ball et al. in paragraph 24.

Therefore, it would have been obvious to combine Ball et al. with Lawrence et al. and Andrew et al. for the benefit of mitigating the impact of defragmentation to obtain the invention as specified in claims 6, 15 and 28.

15. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. (US 6,253,300) in view of Andrew et al. (US 2004/0059863) as applied to claims 1, 10, 19 and 23 above, and further in view of Brown, III et al. (US 6,038,636) and Ball et al. (US 2005/0162944).

16. As per **claims 32-34**, the claims have a similar scope as claims 3, 6 and 7. Thus, claims 32-34 are rejected by the same reasons as claims 3, 6 and 7.

Arguments Concerning Prior Art Rejections

1st Point of Argument

Regarding claims 1, 10, 19 and 23, the applicant argues that the cited prior arts fail to teach defragmenting in response to an I/O request to update an object. Specifically, the applicant points out that Andrew fails to teach that an object is defragmented in response to an update request to that object. However, Andrew teaches defragmenting a disk in response to a shutdown request in Figure 4, wherein a shutdown operation comprises a write operation such as saving the system state.

2nd Point of Argument

Regarding claims 2, 11 and 24, the applicant argues that "the I/O request is executed with respect to the object after defragmenting the object". Specifically, the applicant argues that "copying file after running a defragmentation program" disclosed by Lawrence in column 5, lines 37-39 is different from the claim limitation at issue. However, there exists no patentable distinction between them, and Andrew discloses the shutdown request comprising a write operation being executed after defragmenting the disk in Figure 4. Thus, the examiner maintains his position regarding the rejection.

3rd Point of Argument

Regarding claims 8, 9, 17, 18, 30 and 31, since the cited prior arts disclose the claimed system elements (including the storage controller and the device driver) and the claimed functions, the examiner maintains his position regarding the rejection.

4th Point of Argument

Regarding claims 3, 12, 20, 25 and 32-34, the applicant argues that the cited prior arts fail to teach determining whether an amount of fragmentation of an object exceeds a threshold indicating an acceptable number of bytes stored in non-contiguous locations in response to receiving the I/O request. However, the cited prior arts teach in response to receiving a shutdown request, defragmenting a disk if disk fragmentation exists (Andrew, Figure 4), wherein the examiner interprets "a threshold" in this case is zero and "an amount of fragmentation" in this case is exceeding zero. Lawrence and Andrew do not represent the amount of fragmentation as "number of bytes", wherein

Brown teaches representing size of regions in a storage device as "number of bytes" in column 10, lines 1-5 and in column 7, lines 45-46. Thus, the combination of cited prior arts teaches the claimed limitation at issue.

5th Point of Argument

Regarding claims 32-34, the applicant argues that the cited prior arts fail to teach defragmenting if the object is within one logical partition, and defragmenting if the object is not read-only. However, Andrew discloses defragmenting within a disk, which corresponds to "one logical partition". Further, the examiner notes that read-only means that the object is write-protected. Since defragmenting comprises the process of copying/deleting of an object to a different location, Lawrence inherently defragments only "not write-protected" ("not read-only" from the claim) objects.

6th Point of Argument

Regarding claims 4, 13 and 26, the applicant argues that the cited prior art fail to teach the claimed limitation. However, Douglis teaches allowing defragmentation if there is an indication of unrestricted power source in paragraph 32, wherein such indication is interpreted as a "flag". Further, the flag is user settable since a user can alternate between a restricted power source (battery) and an unlimited power source (wall outlet).

7th Point of Argument

Regarding claims 6, 15 and 28, the applicant argues that the cited prior arts fail to teach the claimed limitation. However, Andrew discloses defragmenting within a disk, which corresponds to "one logical partition". Further, Ball teaches the portions of an object stored in the active memory are not defragmented in the abstract, wherein the object (element 24) is stored in more than one logical partition (partitions a-d).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

A. Claims Rejected in the Application

Claims 1-34 have received a second action on the merits and are subject of a second action final.

B. Direction of All Future Remarks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jae Un Yu who is normally available from 9:00 A.M. to 5:30 P.M. Monday thru Friday and can be reached at the following telephone number: (571) 272-1133.

If attempts to reach the above noted examiner by telephone are unsuccessful, the Examiner's supervisor, Sanjiv Shah, can be reached at the following telephone number: (571) 272-4098.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jae U Yu/

Examiner, Art Unit 2185

12/4/2008

/Sanjiv Shah/

Supervisory Patent Examiner, Art Unit 2185